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Structural Change and Regional Innovation in an Industrial Cluster: Focusing on a Traditional Textile Industry of Nishijin in Kyoto City

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Abstract. Nishijin is the largest traditional textile industrial cluster in Japan. Fabric from Nishijin occupies a significant position in traditional Japanese culture and it holds a large industrial share in Kyoto City. However, a weaving operation called Hataori, which was at one time a family-centered business, has diminished over time due to declining interest in traditional industries. This paper examines the regional "hollowing out" that has caused a decline in the industries surrounding Nishijin, as well as social changes, such as, building deterioration and regional economic stagnation and to suggest policies for regional innovation. To understand the uniqueness of Nishijin fabric and the potential that has accumulated over the process of industrial development, the structural change of Nishijin industry was investigated using statistical data from the "Nishijin Industry Survey Summary (2005, 2011)." The change in the cluster degree was also examined using Kyoto City Industry Statistics and the specialization coefficient. The implications of this study are suggested along with contribution and limitations.

Keywords: textile industrial, Nishijin, specialization coefficient, Regional Innovation

1 Introduction

Nishijin, located in Kyoto City, Japan, is the largest cluster of traditional textile industries that manufacture fine fabrics, such as those used for kimonos. The clustering of traditional textile businesses here goes back approximately 500 years to the Muromachi period. Among these fabric-related industries clustered in Nishijin, Hataori which was a small cloth-weaving factory, in particular, played a key role in fabric manufacturing. Hataori employed family units and installed spinning machines in their homes. The operation was concentrated in the Nishijin textile manufacturing cluster rather than in a large-scale factory. However, Hataori, which simultaneously encompassed both family life and workplace, diminished due to a declining textile industry. Simple houses, small mansions and paid parking lots began to enter this region.

This paper examines the regional hollowing out problem caused by the decline of industry at Nishijin, as well as social changes, such as regional economic stagnation,

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and suggests specific political alternatives for regional innovation. To this end, the history of the rise and fall of the Nishijin textile industry was first examined through a review of previous studies and a literature review to understand the industry's distinct features and the regional potential that was accumulated through the process of industrial development. Moreover, industrial changes in Nishijin were examined using statistical data, and the change in the cluster was also investigated using Kyoto City Industry Statistics and the specialization coefficient.

2 Characteristics and implications of the Nishijin textile industry

The history of the Nishijin textile industrial cluster traces back to the mid-fifteenth century. Farming, sericulture, and weaving began as early as the fifth and sixth centuries, well before the naming of Nishijin (Katagata, 1995). According to records regarding the formation of the city of Nishijin, including Katagata (1995) and Daniguchi (1993), the type of extensive urban renovation that built broad roads by piercing across the blocks connecting the opposite sides of the area in mid-century Kyoto did not take place in Nishijin due to the region's characteristic labor division and textile industry clustering, mostly consisting of independent families. During the extensive land readjustment and urban remodeling process in the modernization era, section readjustment was implemented considering the Nishijin textile industry and the labor division structure that connected households. As a result, the current village structure was formed similar to ancient cities in which many long horizontal blocks were thickly concentrated, joined by narrow roads, resulting in a spider web appearance.

The production process for Nishijin fabrics is divided into material preparation, planning and pattern design, weaving preparation, and weaving and finishing processes, each of which is further divided for a total of more than 20 processes. Master craftsmen specialized in each process as independent economic agents gathered to create a cluster complex in the form of a village. This was a traditional form of industry where people, products, trust, and information moved organically. Here were not only the enterprises in charge of production, but also clustered distribution and sales companies. White thread was transformed into warm fabrics with glamorous patterns as it was passed from one neighbor to the next; these fabrics were then sold by brokers and wholesale dealers. Fig. 1 depicts the the industry development process and the change of collaborative relationships within Nishijin.

The strategies that Nishijin chose for regional innovation were price competitiveness through mass-production and high-quality through small-quantity batch production. The establishment of a mass-production system, which was accomplished through the introduction of new synthetic textile technologies in 1970, as well as advanced weaving machines, all of which intensified price competition, resulted in the disintegration of the traditional manufacturing cluster of Nishijin textiles. These innovations rapidly dismantled the traditional production system, which used to produce value through the division of labor within the region, accelerating corporatization and specialization. The only survivors were small

workshops where master craftspeople made products by hand, design companies that made new designs to bring to the market, and mid-sized firms that led the market.

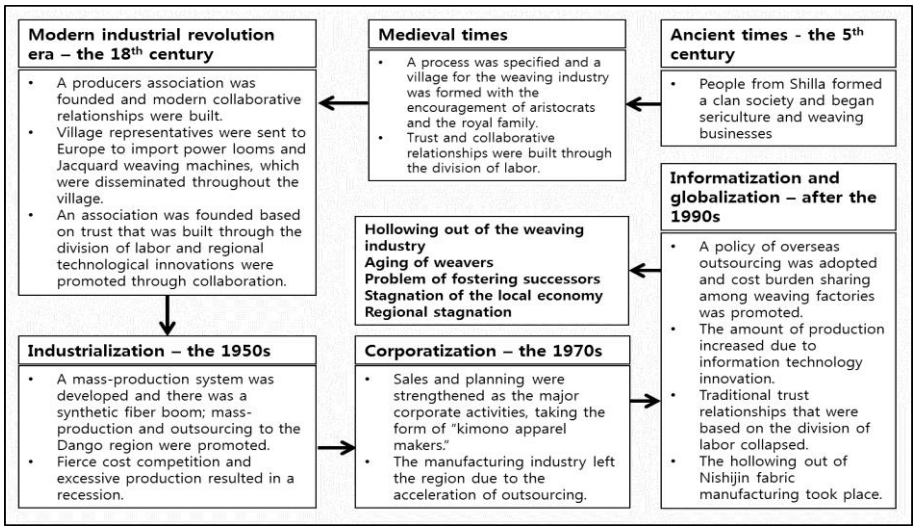

Fig. 2. Industry development and the changes in collaborative relationships in Nishijin

3 Decline of Nishijin textile manufacturing and its implications

The specifics of the changing Nishijin industry were examined based on the Nishijin Textile Industry Survey Summary (2005, 2011). <Figure 2> compares the number of employees, firms, and weaving machines, as well as the total value of shipments from 1975 to 2011. The total value of shipments from Nishijin began to decrease dramatically from 1993 after its peak in 1990. From 2005, there was an upward trend that recovered approximately 25% of the peak shipment values. Around 1990, the Japanese economy faced deepening economic stagnation after the collapse of a bubble and textile manufacturing in Nishijin was hit hard. Two main reasons were defined for the decline of the Nishijin industry: economic change and decreased demand for traditional clothing following the changing lifestyle. This kind of decline is inevitable in some sense. However, the regional decline of Nishijin was also caused by a disregard for the regional collaboration structure for the purpose of maximizing corporate profit.

Comparing the quantitative change of production amounts and means of production, the number of employees, firms, and weaving machines continued to decrease even during the boom period between 1975 and 1990. The first reason was constant advancements in production after the introduction of modern technology. It is understood that structural adjustment of the industry took place, which enabled sustained production capacities that were able to respond to the market demand while

decreasing the number of employees and machines through advancements in production technology and outsourcing. Second, since a few modern corporations progressed in a situation where numerous small family-managed businesses had dominated, the number of employees, firms, and weaving machines continuously decreased in Nishijin in 1990 when the shipment value and profit increased. At this point, the weaving machines and employees who disappeared from Nishijin began to transfer to the Dango region, which was a backward suburban region of Kyoto City that had very low land and labor costs. Another characteristic of the weaving business is that it does not require enormous physical strength. Weaving was an industry in which young male workers did not necessarily dominate; women and the elderly could easily work in the industry. The latter were even sometimes superior to men in their diligence. Thus, the Dango region, which was the center of the primary industry and had a huge elderly population, had lower labor costs than Kyoto and there, it was easy to secure a good, inexpensive labor force. Taniguchi (1993) investigated outsourcing to the Dango region and mentioned the following: "The number of machines inside Nishijin as of 1990 cannot fully explain the decline of Nishijin textile industry. It is because outsourcing occupied over 70%. However, it is proven that the village of Nishijin is facing the very 'hollowing' condition. Hence, Nishijin is not a decline of Nishijin fabric, but a decline of fabric producer." Considering this, it is easy to understand the contradictory change of increased production and decreased means of production in 1990, as shown in <Figure 2>. This confirms that an industrial boom does not necessarily cause a regional boom.

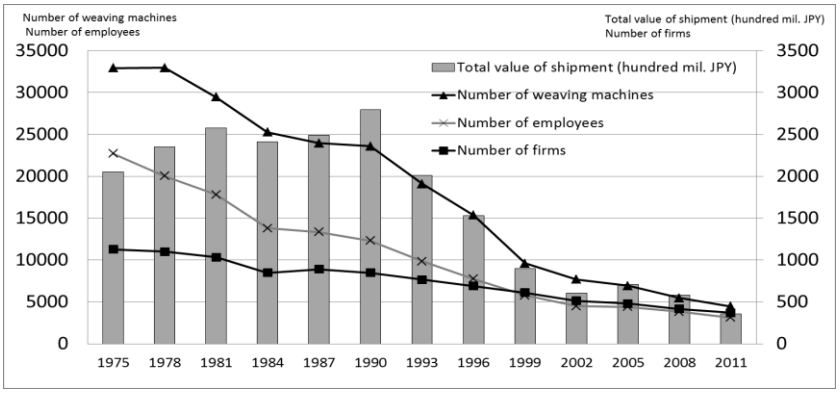

Fig. 2. Comparison of the number of employees, firms, and machines from 1975 to 2011 Source: Based on "Nishijin Company Survey Summary (2005, 2013)" by the Survey Committee of the Nishijin Textile Industry

4 Analysis of the textile manufacturing cluster in Nishijin using the specialization coefficient

Industry in Nishijin experienced a harsh adjustment process as it navigated the collapse of the bubble in the 1990s and the global financial crisis in 2008. Therefore, the currently remaining manufacturing industry can be a consequence of the items among the diverse product classifications in textile manufacturing and the processes that have strong viability in that they overcame the recession. As such, a process where Nishijin possesses strength can be derived by closely investigating the current situation of the fabric manufacturing industry. As the specialization coefficient indicates in which field the regional industry structure is concentrated, it can be used to analyze regional strength. To obtain the specialization coefficient by textile manufacturing-related industry within Nishijin, the survey area was limited to Kamikyo-ku and the specialization coefficient was computed following the definition. The results showed that while the collective decline of textile manufacturing in Kyoto City and Nishijin continued, some textile manufacturing businesses were still closely attached to the region and raised the relative distribution density within Nishijin.

5 Implications and conclusions

The inplications of this study are as follows. First, the current situation of the manufacturing industry's hollowing out and regional stagnation in Nishijin can be attributed to a loss of trust inside the community, which was caused by an outsourcing industrial structure that prioritized short-term profit and increased the burden on small Hataori to cut production costs. Thus, the solution for mitigating the current regional stagnation and industry decline should be found within the establishment of new collaborative relationships. Second, although the textile manufacturing-related industry in Kyoto City is declining overall, an administrative district in Nishijin of Kamikyo-ku is experiencing a relatively growing textile manufacturing cluster. Despite the diminishing size of the traditional clothing industry, it is one where demands over a certain level will always exist as long as Japanese society continues. Therefore, if production within a region can be recovered through reshoring, new investment and regional innovation can be expected. Third, the specialization coefficient analysis results indicate that high-quality artificial threads and twisted yarns that weavers create manually possess competitiveness as they maintain steady regional production amid the trend of outsourcing. Based on the implications above, this study proposes the following three policy suggestions for a new collaboration structure for local innovation. First, government support and the establishment of an industrial ecosystem are necessary so that overseas outsourcing decreases and reshoring increases. Second, a policy that supports diversification and production expansion of the selected products is necessary. Third, there should be a plan to support the independence of Hataori through a linkage with the concept of co-creation in business administration. In addition, the contributions and limitation are also explained.

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